Economic Commission for Latin America and the Caribbean

ECLAC SUBREGIONAL HEADQUARTERS FOR THE CARIBBEAN

Report of the workshop I on policy issues towards effective applications of geospatial technologies and data in support of disaster risk management in the Caribbean

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The Caribbean Catastrophe Risk Insurance Facility

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Workshop I on policy issues towards effective applications of geospatial technologies and data in support of disaster risk management in the Caribbean

Virtual workshop, 30 August 2021

LIMITED
LC/CAR/2021/8
14 December 2021
ORIGINAL: ENGLISH

REPORT OF THE WORKSHOP I ON POLICY ISSUES TOWARDS EFFECTIVE APPLICATIONS OF GEOSPATIAL TECHNOLOGIES AND DATA IN SUPPORT OF DISASTER RISK MANAGEMENT IN THE CARIBBEAN

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A. INTRODUCTION

1. This virtual training workshop on "Policy issues towards effective applications of geospatial technologies and data (GST/D)" was held on 30 August 2021 and aimed at providing to public sector policy and technical officials with responsibilities for DRM, geospatial technology specialists, and disaster risk managers. It was one of two training workshops jointly organized by ECLAC subregional headquarters for the Caribbean and CCRIF SPC (Caribbean Catastrophe Risk Insurance Facility Segregated Portfolio Company). The second workshop titled workshop on technical issues towards effective applications of geospatial technologies and data in support of disaster risk management in the Caribbean was held from 6 to 8 September 2021.

2. These training workshops were delivered under a memorandum of understanding established between ECLAC and CCRIF SPC. The objectives of these workshops were to support the Caribbean Region in building national and regional capacities in the applications of geospatial technologies and data in disaster risk management (DRM). Workshop I was designed for senior technical officers having responsibilities in selecting and using technologies to support DRM and with the following objectives:

- To provide on the applications of GST/D to support decision making in DRM.
- Identify capacity development issues needed to enhance mainstreaming of GST/D in DRM.
- Examine global guidelines to improve the support to risk management through the use of GST/D.
- Identify policies and governance requirements for GST/D.
- Identify financial mechanisms and regional technical cooperation required to harness the full benefit of GST/D.

B. BACKGROUND

3. The Caribbean Region is highly vulnerable to several natural hazards including flooding, hurricanes, storms, earthquakes, volcanic eruptions, tsunamis, landslides, droughts, sea-level rise and coastal erosion. To significantly reduce the negative impacts caused by these hazards, the region needs to develop a holistic disaster risk management strategy which include mitigation, preparedness, response, and recovery plans.

- Geospatial technologies and data (GST/D) can be considered one of the tools necessary for effective disaster risk management (DRM). These technologies can be applied to capture images, information, and data at all stages of the DRM cycle. The application of GST/D in DRM provide for informed decision-making, facilitates and encourages a more systematic and integrated approach to data collection, data storage and data retrieval capabilities.
- Results in the reduction of the overall costs of data collection and management by facilitating data accessibility and sharing to a wide range of decision makers across agencies and other stakeholders.
- Improve the integration of diverse data sets for holistic spatial analysis.
- Encourages the spatial analysis of the impacts of disasters.

4. GST/D comprise of the followings components: computer hardware, data collection hardware, computer software, data and databases, personnel, and applications. GST/D provides the platform that enables spatial analyses particular to DRM. These include for example:

- Temporal analysis of natural hazard parameters
- Trend analysis of the occurrence of disasters

- Spatial analysis of the impact of disaster over a geographic region
- Three-dimensional analysis of the effect of natural hazards
- Multivariate disaster risk analysis
- Natural hazard prediction and modelling
- Simulation of response rate to vulnerable communities
- Analysis of impact zones or anticipated degree of severity
- Storm runoff impacts predictions within watersheds
- Site suitability screening for hazardous waste facilities

C. GENERAL INFORMATION

1. Place and date of the training course

5. This virtual workshop titled "Workshop on policy issues towards effective applications of geospatial technologies and data (GST/D) in support of disaster risk management in the Caribbean" was convened on 30 August 2021 via the online platform Webex. The workshop documents and presentations are available on the ECLAC website via https://bit.ly/2ZUDj9u.

2. Attendance

6. A total of 54 participants attended the workshop. The pre-workshop survey was completed by 19 participants, of which 11 were females (58 per cent), 8 were males (42 per cent). Regarding professional affiliation: 63 per cent work for the public sector, 11 per cent were in academia, and 26 per cent were representatives for "others", comprising of non-governmental organizations and social organizations. Participants represented a cross section of DRM public sector policy and technical officials, geospatial technology specialists, officials with responsibilities for disaster risk management, regional organizations, and developmental partners as follows:

- ECLAC member States in attendance were Antigua and Barbuda, the Bahamas, Barbados, Grenada, Haiti, Jamaica, Saint Lucia, Saint Kitts and Nevis, Trinidad and Tobago, and associate members: Sint Maarten and Turks and Caicos Islands.
- Representatives of DRM institutions and development partners such as: Caribbean Disaster Emergency Management Agency (CDEMA); Caribbean Development Bank (CDB); the University of the West Indies (UWI): Earthquake Unit, Mona Campus, Seismic Research Centre, St. Augustine Campus, and the Association of Caribbean States (ACS).
- United Nations officials in attendance were from the Economic Commission for Latin America and the Caribbean (ECLAC), Department of Economic and Social Affairs (DESA), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Population Fund (UNFPA) and International Organization for Migration (IOM).

3. Objectives and structure of the workshop

7. The objectives of the workshop were to:

- Present on GST/D applications supporting DRM and use in the Caribbean Region.
- Identify human and technical capacity resource issues needed to enhance mainstreaming of GST/D in DRM.
- Examine good practices on the use of GST/D in support of DRM.

- Identify policy and governance issues that should be addressed for effective use of GST/D.
- Identify financial mechanisms and regional technical cooperation required to harness the full benefit of geospatial GST/D.

During the workshop, there were several presentations which were followed by round table discussions on the use of GST/D in DRM. These discussions are summarized in the following sections below.

D. SUMMARY OF KEY OUTCOMES OF THE WORKSHOP

1. Opening session and welcome remarks

8. Delegates were welcomed to the meeting by the Director of ECLAC subregional headquarters for the Caribbean. She noted the importance of the workshop in the context of the Caribbean's vulnerability and recent experience with natural events such as the volcanic eruption in Saint Vincent and the Grenadines, the recent earthquake in Haiti, several recent tropical cyclones and flooding events in the region. She expressed special gratitude to CCRIF SPC for its long-term partnership with ECLAC in DRM and in supporting the specific area of research into the application of GST/D in the subregion. She wished participants all success in the delivery of the workshop.

9. The representative of CCRIF SPC, Technical Assistance and Corporate Communications Teams, shared an overview of products offered to members. CCRIF offers parametric insurance coverage for earthquakes, excess rainfall, tropical cyclones, fisheries[1] through its Caribbean Ocean and Aquaculture Sustainability Facility (COAST) and electric utilities. The level of hazard and impact are considered in the design of these policies for example: wind intensity for hurricanes, the amount rainfall for excess rainfall and the level of ground shaking caused by earthquakes. The workshop participants were informed that CCRIF current membership stands at 23 members: 19 Caribbean Governments, 3 Central American Governments and 1 electric utility company. CCRIF is committed to ensuring its products are relevant to their members' needs. Since its inception in 2007, CCRIF has made 54 payouts to 16 member governments, totalling approximately US$ 245 million. Its most recent payout of US$ 40 million was made to the Government of Haiti in the aftermath of the recent earthquake.[2] CCRIF parametric insurance policies are triggered by a predetermined amount of loss as indicated in a country's policy. Importantly and with respect to the objectives of this workshop, CCRIF models are dependent on high quality data —from satellites, earthquake instrumentation and weather models— all remotely sensed data. It was noted however that CCRIF is exploring the use of locally obtained on-the-ground data in some of its models.

10. Participants were informed that CCRIF SPC prepares country risk profiles for each peril, which underpin the parametric insurance policies that are provided to its members. The representation of countries' exposure is critical to ensuring the accuracy of the models and the modelled losses for hazard events. The exposure database shows the location and replacement value of the assets on the ground which are vulnerable to the hazard. Geospatial technologies are critical to this part of the work. In closing, she indicated the Facility's appreciation for having continued collaboration with ECLAC and in this case, the delivery of this workshop on GST/D in disasters as the application of these tools and data will contribute to the accuracy of databases for national hazard and exposure data. These databases are used by the models and inform the value that triggers a policy and the value of potential payouts for each policy. In closing, she thanked ECLAC for their partnership and looked forward to a productive day.

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1 CCRIF SPC fisheries product is known as the Caribbean Ocean and Aquaculture Sustainability Facility (COAST) policy.

2 7.2 Magnitude, 14 August 2021.

2. Session one: applications of geospatial technologies and data in support of disaster risk management

11. The ECLAC DRM consultant reiterated the importance of continuously building accurate and current databases and informed that the Caribbean Region is progressing in the use and application of Geographical Information System (GIS) in DRM. That policies, legislation, inter-agencies' coordination, adequate funding and up to date data are essential requirements to ensure effective and sustained application of GST/D in DRM. It was emphasized that data are not static and are always evolving and therefore there is the need for continuous and timely updating of the corresponding data fields.

12. The ECLAC DRM consultant gave a summary of the application and use of GST/D:

- That GST/D involves the collection of spatial and attribute data. This includes data on critical facilities such as hospitals, utility lines, transportation networks and trees.
- The stages for the development of applications in GST/D includes planning and decision- making on the data required, resource allocations, data collection, database design, digitization of hardcopy data, and development of computer user interface.
- Data management: the metadata should be developed for all data themes digitized.
- GST enable faster and more efficient data analysis while facilitating data-driven decision-making. This is demonstrated for example, when facing an imminent hazard and immediate decisions are required to be taken for disaster response management.
- GST can function as assessment tools in the determination of damage and loss following the impacts of disasters.
- It is important for countries to build and maintain accurate and current databases needed for DRM.
- The ECLAC lead facilitator used the example of Saint Lucia's disaster preparedness as a demonstration of best practice in disaster preparedness. Saint Lucia maintains an up-to-date database of all persons who owns disaster response machineries such as: tractors, backhoes, and other heavy equipment along with their names and contact information so they could be contacted and their services activated as elements of disaster preparedness.
- The use of risk transfer mechanisms such as flood insurance can help mitigate the financial loses in the event of the flood disaster.

13. He also gave a summary of the components of GST:

a. The following are the key properties of spatial data that were identified to make data useful:

- Projection: this is the method by which the curved 3D earth's surface is represented by X, Y coordinates on a flat 2D map/screen.
- Scale: this is the ratio of distance on a map to the equivalent distance on the ground.
- Accuracy: provides on how well the database information matches the real world.
- Resolution: this is the size of the smallest feature able to be recognized.

b. The components of GST include for example: Global Navigation Satellite Systems (GNSS), remote sensing (RS), Geographic Information Systems (GIS). A brief description on the use of each of this these components on disaster management are:

- In applications for DRM, GNSS is used to map the locations of disaster-prone areas.
- Remote sensing: the use of satellite earth observation systems and unmanned drones are used to map inaccessible areas and captures information in real time.

- Geographic Information Systems (GIS): In disaster management applications, GIS is used in conjunction with historical and current data to analyze vulnerable communities and critical facilities such as hospitals, government buildings, transportation, and utilities. GIS however goes beyond software; it includes the data attributes which are critical to the analysis and modelling of disaster risks. Spatial and attribute databases must be readily linked, and the layered concept of GIS assists in organizing the data, which makes the performance of spatial analysis of disaster phenomena easier. When GIS databases are effectively integrated, it can provide the required information to support emergency responses and the identification of hot spots.

c. In demonstrating the use of GIS for spatial analysis, the following case examples were used:

- The Municipality of Portmore3 in Jamaica has a well-defined land use maps which facilitates the identification of vulnerable populations and the mapping of areas prone to natural hazards.
- GST/D was used in developing hazard maps for the recent volcanic eruptions in Saint Vincent and the Grenadines.

14. After the presentation was completed, the representative from the ACS inquired on the integration of GST/D into early warning systems in the Caribbean Region and if there are examples of success stories.

15. The ECLAC DRM consultant provided the following responses to the question raised by the ACS representative:

- That at the wider Caribbean level, data on early warning systems for hurricane storms and tsunamis are obtained from the National Oceanic and Atmospheric Administration (NOAA) and the United States Geological Survey (USGS) respectively. The protocols for assessing this data are well established in the region. These international partners have provided over the years consistent and reliable data and information that has helped the region in mitigating the impact of these hazards. However, the high cost of technology required and the limited skills available in the region have made it necessary for the region to continue to rely on these partners for the monitoring and interpretation of the data supplied.

- In demonstrating recent successes in the application of GST/D in DRM, the following two selected cases were provided:

  (i) Saint Vincent and the Grenadines: the region gained some support in refining the monitoring science of volcanic eruptions and tsunamis. This was demonstrated in the recent eruptions of the La Soufrière volcano.
  (ii) Jamaica: this country's approach to the use of GST/D to support DRM decision-making was referenced. In the case of Jamaica and as a best practice, GIS has been institutionally integrated both at the local governmental and national level.

16. The ACS representative followed with a second question. She enquired on the possibility of establishing a Caribbean regional early warning system.

17. In response the ECLAC DRM consultant agreed that the region is overdue in having a Caribbean regional platform for early warning system to supplement what is currently being provided for tsunami and hurricane tropical storms hazards. These regional platforms are more practical to implement because of the

[3] For more information in Portmore, Jamacia see link at: Planning Institute of Jamaica, available at: https://www.pioj.gov.jm/gis-maps/.

wide extent of the impact of these two hazards. It is, however, more difficult to have a regional early warning system for localized and more frequent hazards such as flash floods, landslides, and debris flow without a regional governance framework on data standards, data collection and data sharing with technological investment to serve the data and develop the relevant early warning applications for the region.

18. He added that as a priority, one area requiring urgent attention is the development of GST/D-based early warning systems for flood risk management. This will require long-term historical rainfall data and flood incidence. This need was evident during the floods in Guyana which affected several communities during the months of July and August 2021.

3. Session two: human capacity development issues for effective mainstreaming of geospatial technologies and data in disaster risk management

19. The objective of this section of the workshop was to share the human resources requirements needed for effective and efficient use of GST/D in DRM. The ECLAC DRM consultant in delivering this session of the workshop provided insights and guidelines related to securing adequate levels of human resources and including GST/D capacities that are critical for effective application of GST/D. Participants were informed on the data obtained from pre-assessment workshop valuation and with respect to levels of GST/D capacity and skills in the region (see annex 1, table 1). In addressing the capacity needs, the following were presented:

- Specialized skills sets are required include disaster risk modelling, GIS applications development, satellite data processing, global navigation satellite systems data processing, unmanned aerial vehicles mapping, database design, database management.
- One of the main points raised in this section was that given the nature of GST/D and the need to keep abreast of these technologies. The mainstreaming of GIS databases must be managed by technically skilled persons who are able to develop tailored geospatial applications to meet the specific requirements of each country.
- GST/D knowledge and skills can be transferred among countries through regional collaboration including community of practices, short-term study-tours, or the establishment of communities of practice and volunteers that can be dispatched on critical mission when needed such as MapAction.

4. Session three: supporting geo-enabled disaster risk management within the Caribbean Region - policy issues towards effective applications of GST/D in support of disaster risk management in the Caribbean

20. The Principal Director (a.i.), National Emergency Response GIS Team (NERGIST) facilitated this section of the workshop. The presentation contained three parts.

21. In the first segment of the presentation, she introduced the Sendai framework for Disaster Risk Reduction (2015–2030)[4] and the United Nations Global Geospatial Information Management (UN-GGIM) Working Group on Geospatial Information and Services for Disasters:

- An overview of the Sendai Framework for Disaster Risk Reduction (2015–2030) was presented and including its scope and purpose, expected outcomes, goal and targets. The presentation also provided information on the 2015–2030 priorities for action and that the targets of the

[4] Sendai Framework for Disaster Risk Reduction see link at: https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015–2030, cited October 9, 2021.

Sendai Framework are aligned with that of the UN-GGIM Strategic Framework for Geospatial Information and Services of Disaster.

- The UN-GGIM Strategic Framework is aimed at guiding Member States and other stakeholders in making available and accessible all quality geospatial information and services in operations within and across all sectors, before, during and after disaster events.
- Participants were informed on that the UN-GGIM Working Group on Geospatial Information and Services for Disasters was created by the Committee of Experts at its fifth session, under decision 5/110 and that the current co-chairs are Jamaica and Japan. This working group has the global mandate to reduce the effects of disasters ensuring the lives, livelihoods and health of people are secured. The working group is comprised of 56 expert members from Member States, United Nations offices and agencies, international organizations, non-governmental organizations, academia, private sector and from the United Nations system.[5]
- At the tenth session of UN-GGIM Working Group on Geospatial Information and Services for Disasters held in August 2020, the Committee of Experts under decision 10/108[6] endorsed the working group's revised terms of reference and approved the preparation of an updated work plan that would include existing and future work items. Some of these work items are stimulating public awareness and increasing communication initiatives, including collaborations to convene forums to showcase the relevance and applicability of the Strategic Framework on Geospatial Information and Services for Disasters [Resolution SF-GISD 2018/14]. The Framework serves as a guide for Member States in their respective national activities to ensure the availability and accessibility of quality geospatial information and services across all phases of disaster risk management. The SF-GISD approach is applicable in addressing both thematic and compounded hazard scenarios.

22. The segment of her presentation concluded on the following priorities for the Caribbean Region:

- The need to build stronger partnerships with the private sectors is critical as financial support for GST/D resources are costly. Survey data, the use of Unmanned Aerial Vehicles (UAV), handheld GNSS units, database servers and software require financial support.
- To secure a successful integration of GST/D is the identification of a champion, a GIS national agency, open channels of communication and coordination among various national agencies, effective partnerships, mutual exchanging of data and learning, plans, programmes, laws, and policies developed and deployed in a systematic way would serve to support GST/D.
- Awareness raising is important especially in translating the information into buy-in. Some of the ways this could be achieved is by integrating GST/D skills into the region's educational programmes, ongoing training opportunities, harnessing GIS expertise, media involvement. It also plays a role in disseminating information locally, nationally, and regionally and sharing best practices with member States.
- Data management is another component necessary for the success of GST/D system. Maintaining a national geospatial database requires large volumes of data, frequent updating, especially in the case of the Caribbean, since the region is plagued with multiple hazards. The readiness of relevant databases and the involvement of key local experts are critical. In addition, a shared common database should be readily available and accessible DRM. Common database infrastructure and services should include the establishment of a national GST/D centre and triggers to engage the national entity into action should be fully developed.

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[5] UN-GGIM: Working Group on Geospatial Information and Services for Disasters - Work Plan 2020–2023, see link at: https://ggim.un.org/meetings/GGIM-committee/11th-Session/documents/WG_Disasters_Work_Plan_draft_2021-08-4_final.pdf, cited October 10, 2021.

[6] Tenth session of the Committee of Experts on Global Geospatial Information Management 26 and 27 August and 4 September 2020, see link at: https://ggim.un.org/meetings/GGIMcommittee/10thSession/documents/UNGGIMTenth_Session_Informal_Paper_containing_draft_decisions_4Sept2020.pdf.

The system should also include a list of regional experts that could offer assistance and additional support.

23. In part two of her presentation, she explained that the Caribbean Geospatial Development Initiative (CARIGEO)[7] initiative is coordinated through an Executive Committee. She informed that the CARIGEO has as its focus building on the future we want through geoempowering of the region. This regional initiative is supported by Esri and hosts the Caribbean GeoPortal on its website. The Caribbean GeoPortal is a platform that facilitates an open mapping community containing data that users can access free of cost. This portal offers the option for users to publish their data. Generally, it can be used by anyone working within the region to conduct analysis on DRM challenges. The web application is configurable and the Executive Committee encourages its use to advance the region's sustainable development agenda. To date the CARIGEO initiative has presented several webinars to benefit persons wishing to learn about the benefits of GIS applications within a Caribbean context.

24. Part three of her presentation dealt with the National Emergency Response GIS Team (NERGIST) of Jamaica. She informed that the NERGIST was formed following on the devastation caused by Hurricane Ivan in 2004 and in 2010 it received Cabinet approval and provided examples of the work of this agency. The NERGIST responds to all disasters including for example hydrometeorological and disease outbreak. In the most recent case of the COVID-19 responses, the services included: provision of onsite and remote mapping services for COVID-19 case generation static COVID-19 status maps, conduct analysis and predictive modelling, development and maintenance of various COVID-19 operations dashboards, generation of survey form for tracking and monitoring, provision of geospatial technical support and problem solving, GIS sensitization and training. These services were conducted in cooperating with the National Emergency Operations Centre of Jamacia. In addition to working on local disaster management cases, it also supports the CDEMA Regional Rapid Needs Assessment Teams.

5. Session four: national governance challenges in implementing GST/D in disaster risk management

25. For this section country representatives were invited to make a short presentation on how their countries are addressing the applications of GST/D in DRM. Contributions were received as follows:

26. The Planning Officer, Saint Kitts and Nevis National Emergency Management Organization, noted that for the last two years the National Disaster Management Office has established data sharing partnerships with the Planning Department. The country has made advances by successfully conducting vulnerability assessments with businesses and created hazard maps using ArcGIS in collaboration with the Physical Planning Department. Amongst the challenges faced are:

- The non-standardization of spatial data is posing problem when shared
- The need for dedicated GST for the DRM
- Due to a lack of equipment, required resources have to be requested from other departments

27. The GIS Specialist of the Office of Disaster Preparedness and Management from Trinidad and Tobago noted that the main challenges the country is facing in implementing GST/D for DRM are:

- Data management: there was no central depository for data, many of their offices worked in silos and few agencies shared their data.
- Policy and legislation: there is a need for legislation and policy to provide guidelines on data sharing.

[7] CARIGEO, see link at: https://www.caribbeangeoportal.com/pages/about-us, cited October 10, 2021.

- Resourcing: the lack of GST skilled human resources. Notably the disaster management office has one person charged with conducting GST/D activities. He believed GST/D was not adequately financed in his country.
- Lack of awareness at the country level and a lack of robustness of the analysis required.

28. The Geographic Information Officer, Department of Physical Planning Saint Lucia, noted the main challenge was the lack of political support and policies. The GIS experts find it challenging to convince policymakers of the advantages associated with this technology and creating and maintaining related databases. Mentioned was made of the recent launch of a World Bank project with the purpose of supporting the national spatial initiative in DRM.

6. Discussions

29. Following on the presentations by member countries, the ECLAC DRM consultant offered the following interventions:

- There is the need to build stronger coordination between the DRM policymakers and technocrats.
- The need to demonstrate the value of GST/D through DRM applications development to decision makers.
- In respond to a question from the UN-GGIM representative on confidentiality when sharing data, it was noted however that the question of confidentiality must be carefully addressed as that data can these days be access through open-source channels.
- He suggested that all countries in the Caribbean should embark on having GST/D policies and procedures for conducting national vulnerability assessments. This can possibly be supported through such regional bodies as the CDB and CCRIF SPC.

30. The Principal Director (a.i.) National Emergency Response GIS Team (NERGIST) shared that Jamaica's success and advancements in GST/D took a lot of time and effort and that it was important to have champions and continuity. As a recent best practice, she added that during the COVID-19 pandemic, Jamaica took the opportunity to develop many spatial tools as part of its COVID-19 response. These include for example: updates on hospitals, beds available, quarantine status and other Ministry of Health required information. She explained that the development of tools was one step towards getting agencies to build cross institutional engagements and work together. She encouraged participants to dedicate themselves to advancing GST/D in the region through commitment and resilience. There is urgency in getting governments to recognize the importance of GST/D in DRM. In this respect, having geospatial and/or political champions would be advantageous. Lastly, she called that the identification and mobilization of funds are necessary to drive the utilization of GST/D in the region.

31. In recognition of the Jamaica's champions, she attributed the country's progress in GST/D to the foundational work of Ms. DaCosta, who had the vision, dedication, and commitment to pave the way for Jamaica. She also highlighted the substantial work of other colleagues who led the charge in pushing the country forward in this area. She informed that champions are essential in raising the level of awareness and effective partnerships. In addition, she emphasized that data should be created alongside appropriate tools, government agencies should be mandated to provide the necessary data and geospatial professionals should continually update their skills.

32. The Statistician, Statistics Division, United Nations Initiative on Global Geospatial Information Management (UN-GGIM) and United Nations Group of Experts on Geographical Names (UN-GEGN) Secretariat, enquired of known regional examples of GST/D applications.

33. In response the ECLAC DRM consultant offered the example of the British Virgin Islands. This territory first prepared a national policy then proceeded with development of technical aspects of GST/D to support development planning. The real issue, therefore, was the lack of policies and legislation to support GST/D in the region. Inevitably the region should develop and adopt a regional policy on vulnerability assessment much like the European Union this would encourage access to financing. As it stands, he articulated the view that the Caribbean Region has the human capacity necessary to integrate GST/D but lacked the funds, political support, and champions needed.

7. Session five: round table discussions on the use of geospatial technologies in disaster risk financing and disaster risk management

34. This session gave focus to the issue of use of GST/D in the financing of DRM. Brief contributions were made by CDEMA, CCRIF SPC and ECLAC.

35. In this session the GIS Specialist of CDEMA presented a historical perspective on the evolution of the organization and with Sint Maarten becoming its most recent member. The representative of CDEMA presented on the Caribbean Risk Information System (CRIS) platform as an example of an integrated platform for geospatial data management, disaster risk management and climate change adaptation information. The geospatial component of aspect of CRIS is GeoCRIS that facilitates evidence-based decision-making and guides development planning.

36. The representative from the CCRIF SPC Technical Assistance Team expressed that the use of GST/D are essential in the operations for her organization. She informed that data is necessary for decision-making, validation of actuarial products, and in the negotiations of CCRIF SPC services. Emphasis was placed on the need to include disaster risk financing (DRF). This is often not included in DRM discussions. These engagements bridge how the "real world" of hospitals, infrastructure and hazards are linked to modelled losses in dollar values. The risk profiles show the average annualized losses for different perils as well as the losses for different return periods for different perils, which can then be compared to determine the best mix of DRF instruments to address different types and levels of hazards. To support this requirement, the CCRIF SPC has facilitated the linkages between ministries of finance (CCRIF SPC primary country contacts) and technical agencies for disaster management, meteorology and seismology. This also included engaging ministries of finance in extensive discussions relating to hazard risks and potential economic impacts.

37. The representative from the CCRIF SPC Technical Assistance Team added that the CCRIF SPC model of average annualized losses for each parameter, type of loss over a certain period is dependent upon data. The applications of GST/D are directly linked to the capacity of CCRIF SPC to be able to finance its DRM activities. She provided an example of a model where GST/D is applied in the delivery of their services.

- The CCRIF SPC rainfall model: In this model, different data sources are used. For example, satellite data is used to determine rainfall intensity and patterns. This model is being further explored with the objectives to obtain member-country rainfall data. It is anticipated that this modelling can be useful in providing data to inform on projected and actual rainfall impacts. Real time forecasting that can also be integrated into such interactive platforms such as Wemap[8] is also being explored. It was emphasized that economic impacts can be analyzed using these tools.

38. The Coordinator of ECLAC Sustainable Development and Disaster Unit presented on the major areas that required to support DRM and including:

[8] Wemap - see link at: https://getwemap.com/products/, cited 29 September 2021.

- Access and use of data for effective and timely DRM decision-making. Data is required on risk assessments and other pre- and post-disaster analytics. Data has to be analyzed and understood for example by ministries of finance for budgeting and setting resilience-oriented strategies, allocation of resources for emergency response, recovery and reconstruction.
- Improved coordination, collaboration, and networking among policymakers, research institutions, DRM agencies and technology providers. That this coordinated framework can serve to reduce duplicating activities, sharing of best practices, identifying knowledge gaps and/or developing strategies in addressing priority areas.
- There is a need for increased collaboration with regional and international partners and including South-South and SIDS-SIDS partnerships, promoting public-private partnerships for example in access to best available technologies, cultivating local and regional skills for use and applications of geospatial tools.
- The need for policies, institutional systems and adequate financing for continuous training, capacity development, information gathering and community engagement. In addition, there is the need to support communication and awareness raising on the use and applications of geospatial technologies and data.

8. Vote of thanks and closure

39. The Coordinator of ECLAC Sustainable Development and Disaster Unit thanked all participants for their attendance at the workshop. Participants were reminded to complete the survey of application of GST/D as well as an online workshop evaluation survey. The workshop concluded at 12.10 p.m.

E. SUMMARY OF EVALUATIONS

1. Content and delivery of trainers

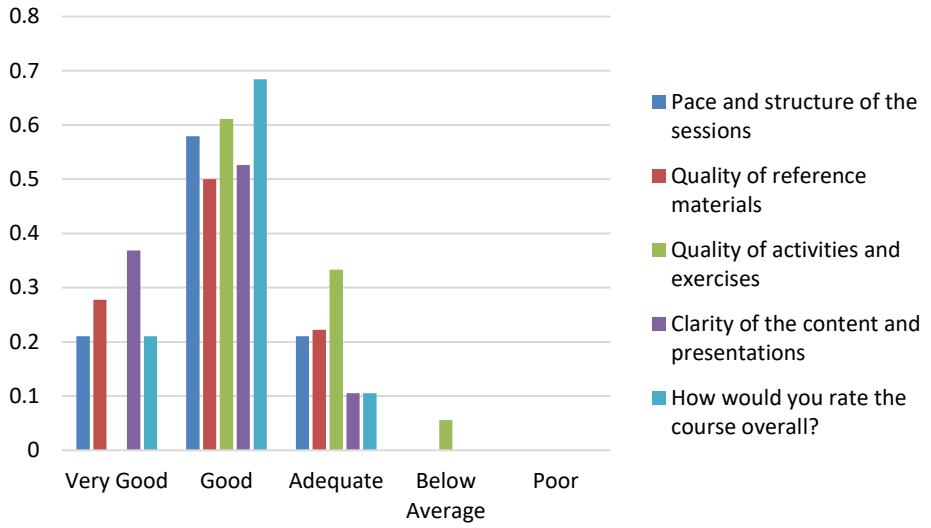
40. An evaluation form was provided to participants to obtain feedback on the workshop (annex 2). This section of the report outlines the summaries of their responses.

41. On a 5-point Likert scale[9] ranging from very good to poor, 21 per cent of respondents found the pace and structure of the workshop very good, 58 per cent found it good, and 21 per cent found it to be adequate. Regarding the quality of reference material relating to the workshop, 28 per cent found it to be very good, 50 per cent found it good, and 22 per cent thought it was adequate.

42. Respondents identified the quality of activities and exercises, 61 per cent thought they were good, 33 per cent found them to be adequate and 6 per cent indicated they were below average. Referencing the clarity of the content and presentations, 37 per cent of the respondents found them to be very good, 53 per cent thought they were good and 11 per cent found them to be just adequate. Overall, 21 per cent of the participants rated the workshop as very good, 68 per cent thought it was good and 11 per cent found it to be adequate.

[9] Likert scale, this is a scale used to as rating scale used to measure attitudes or opinions, see definition at link: https://www.statisticshowto.com/likert-scale-definition-and-examples, cited November 7, 2021.

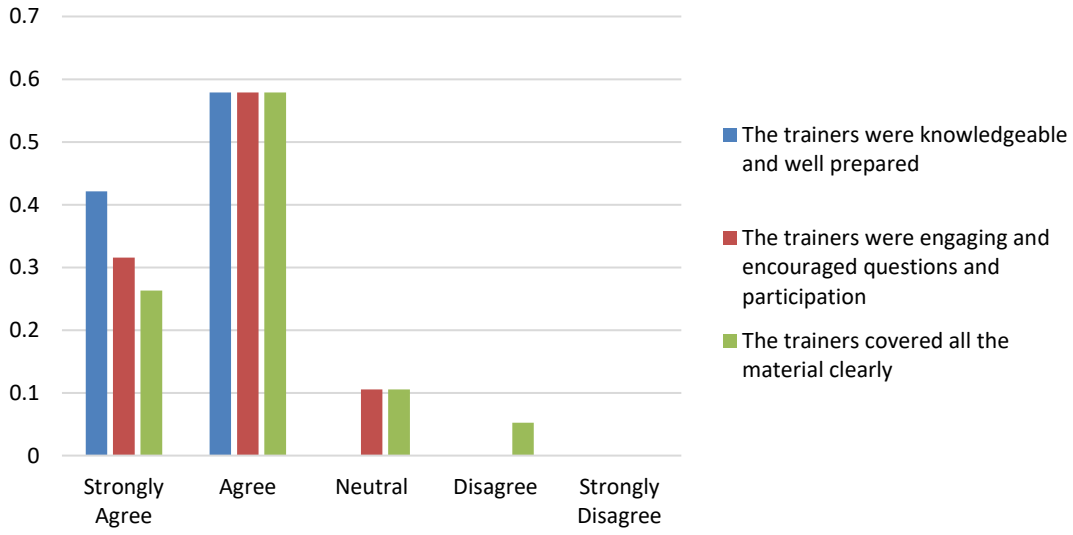
FIGURE 1
PARTICIPANTS' FEEDBACK ON CONTENT, DELIVERY AND ORGANIZATION



43. Respondents rated the facilitators' capacity, engagement, and preparedness. With regards to the trainers being knowledgeable and well prepared 42 per cent of respondents strongly agreed and 58 per cent agreed. For the second evaluation of the trainers, which examined engagement and whether questions and participation were encouraged 32 per cent strongly agreed, 58 per cent agreed, and 11 per cent felt neutral.

44. Lastly for the evaluation of the trainers, 26 per cent strongly agreed when asked if trainers covered all the material clearly, 58 per cent agreed, 11 per cent felt neutral and 5 percent disagreed with the notion of materials clearly being covered.

FIGURE 2
PARTICIPANTS' FEEDBACK ON THE FACILITATORS' CAPACITY, PREPAREDNESS AND OVERALL ENGAGEMENT



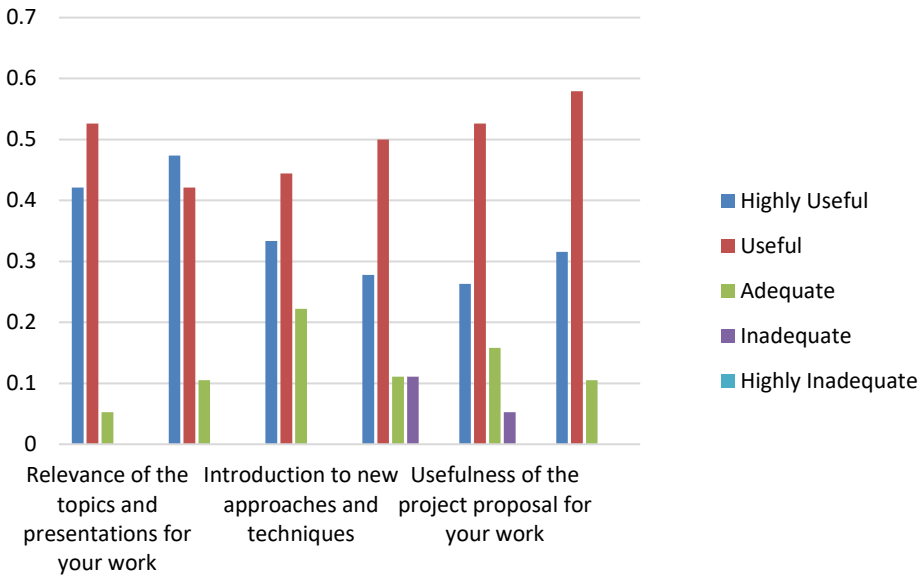
45. Participants were asked about the impact of the workshop while focusing on six classifications. For the first classification "relevance of the topics and presentations for your work", 42 per cent found the workshop highly useful, 53 per cent found it useful and 5 per cent found it to be adequate.

46. For the second classification "relevance of the recommendations for your work", 47 per cent thought the recommendations would be highly useful, 42 per cent thought they would useful and 11 per cent thought they would be adequate.

47. With regard to "introduction of new approaches and techniques", 33 per cent believed the workshop would be highly useful in impacting their ability to apply new approaches and techniques, 44 per cent believed it would be useful and 22 per cent believed it would be adequate. Under the classification "strengthening of knowledge about universal and comprehensive social protection systems and its components", 28 per cent agreed that the workshop was highly useful in this regard, 50 per cent stated that it was useful, 11 per cent thought that it would be adequate and another 11 per cent concluded that it would be inadequate.

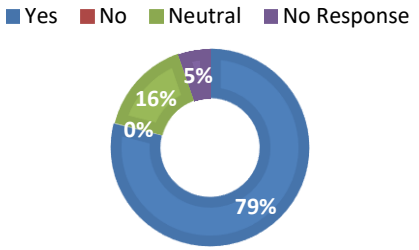
48. In referencing the "usefulness of the project proposal for your work", 26 per cent stated that this was highly useful, 53 per cent found it to be useful, 16 per cent thought it was adequate and 5 per cent revealed that the project proposal might have been inadequate. For the final classification "usefulness of the shared experiences and demo", 32 per cent thought this was highly useful, 58 per cent found it to be useful and 11 per cent thought it was adequate.

FIGURE 3
PARTICIPANTS' FEEDBACK ON THE IMPACT AND RELEVANCE OF THE WORKSHOP



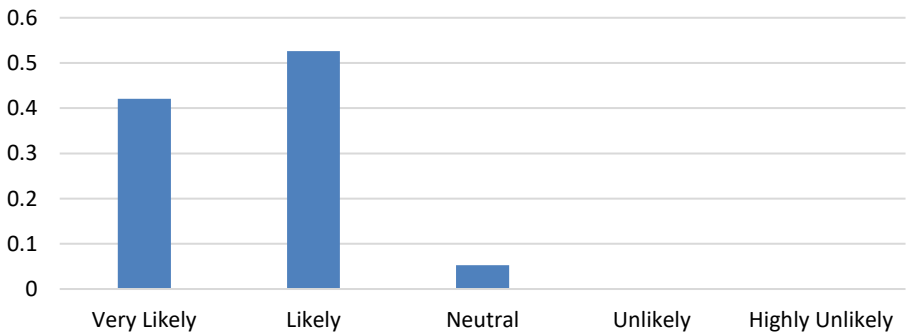
49. When asked if the training met their expectations, 79 per cent responded in the affirmative, 16 per cent felt neutral and another 5 per cent did not respond.

FIGURE 4
PARTICIPANTS' FEEDBACK ON THE WORKSHOP'S ABILITY TO MEET THEIR NEEDS



50. Respondents were asked about the likelihood of them applying what they learned at the workshop within their respective organizations: 42 per cent expressed that this was very likely; 53 per cent indicated that it was likely and 5 per cent remained neutral.

FIGURE 5
LIKELIHOOD OF THE APPLICATION OF KNOWLEDGE



2. Responses and comments to open-ended questions

51. Participants found the content useful. However, participants had very differing answers as to which part they found the most useful, which indicates that different respondents benefited most from differing sections of the workshop.

52. What were the most important outcomes / recommendations of the workshop?

- Improved understanding of how a national GIS can be implemented using a shared responsibility approach.
- Sensitizing policymakers to the importance and need of high-quality, up to data geo data. This is something that needs to be prioritized.
- Collaborations, data management and funding importance.
- The access and use of data are essential for effective and timely DRM decision.

- Improved coordination and networking among policymakers, researchers, disaster management agencies and technology is vital to effective planning and emergency response for the region.
- New approaches and techniques.
- Need for greater access to data.
- Having a standardized procedure and policy for sharing spatial data across the region.
- Various geospatial information and technology examples explained and areas of application, with specific case studies.
- Applications of GST/D in support of DRM.
- Contribute to the implementation of technological tools to help and a pooling of knowledge in the area of disaster risk management to the Caribbean community.
- The need to strengthen data sharing among key agencies.
- Discussions to be held concerning information management and data security.
- Exposure to the policy framework for GIS in DRM.

53. How do you intend/expect to apply the knowledge acquired in this training workshop?
- Continue to research and apply the knowledge gained.
- In disaster management
- I intend to apply the various knowledge specifically to the Bahamas Spatial Data Infrastructure.
- I intend to use this knowledge for the benefit of the organization or the country but without having the necessary tools available it would not be possible.
- I'd like to request a copy of the materials be shared. As much as I appreciated the workshop, I do not remember all the nuances and I feel this would help.
- In projects and technical supports.
- It will better inform interventions that we will be planning.
- Knowledge transfer, further discussions on incorporating geospatial data and technologies in DRM projects and research.
- Prioritize GIS and data management systems in my work programme and advocate for strengthening of same at the national (strategic) level.
- To assist with establishing the appropriate policies.
- To work with my committee members to develop a policy that will streamline workflow in the creation of data and sharing of complete and accurate data among the public and agencies to hence timely emergency response and improve sustainable development planning within the region.
- Also develop a policy that will seek to build out both the physical and human capacity of the local Government and its agency were Geospatial technology is part of its operations.
- We are currently developing several platforms that incorporate the use of geospatial data to improve public access to DRM information and analyses.
- We intend to use the UN-GGIM Strategic Framework to develop a national strategy within the context of application in Jamaica.

54. What are the strengths of the training workshop?
- Information is well presented.
- Knowledge of the geographical information.
- Regional examples shared.
- Shared experiences for different countries in the region, collaborative potential.
- Technological resources required to build the prototype GIS- based flood.
- The examples of best practices from British Virgin Islands, Jamaica, and Saint Vincent and the Grenadines were good learning points.
- The knowledge gained from various geospatial information and technology examples.
- The panel discussions.

- The presentations were concise and relevant to the topic. The presenters were also engaging in their delivery.
- The strengths of the workshop are the presentations delivered guidelines and structures and examples that the Caribbean islands can model after to improve or develop Geospatial Technologies.
- Very valuable content and discussions.
- Wealth of knowledge and examples of projects done.

55. What areas of improvement would you recommend?
- Further research on hazards, data quality assurance, further technical training.
- Include activities to promote group engagement and to test if the knowledge imparted has been received.
- Less preamble from the various agencies who presented. More focus on actions to address the issue at hand.
- Management of time.
- More graphics of maps on vulnerability, risk assessment maps and geospatial technology used.
- Pace was a bit fast at times.
- Practical policy application.
- Sticking to the time.
- Technological resources required to build the prototype GIS -based flood.
- Training is highly recommended.

F. CONCLUSIONS

56. The following are the main conclusions from this workshop:

- Policies, legislation, inter-agencies' coordination, adequate financing and up to date data are essential requirements to ensure effective and sustained application of GST/D in DRM. There is the need to build stronger coordination between the DRM decision makers and GST/D technologist.
- Specialized skills sets are required include disaster risk modelling, GIS applications development, satellite data processing, global navigation satellite systems data processing, unmanned aerial vehicles mapping, database design, database management.
- Data required to support informed decision making is not static. In this regard, countries and development partners are required to have the capacity, technology, institutional arrangements and other required resources to build, maintain and continuously update data fields. In addition, a shared common database should be readily available and accessible DRM.
- Common database infrastructure and services should include the establishment of a national GST/D centre and triggers to engage the national entity into action should be fully developed.
- Recommendations were made to have a Caribbean regional platform. This regional platform can provide services of regional experts and serve as an early warning system. It can also serve to supplement the early warning data services currently being provided for tsunami and hurricane tropical storms hazards.
- Public-private partnerships. The need to build stronger partnerships with the private sectors is critical as financial support for GST/D resources are very costly.
- Awareness raising on the benefits, use and applications of GST/D is important especially in translating the information into buy-in. GST/D champions are essential in raising the level of awareness and effective partnerships. This will also serve in disseminating information and sharing of best practices nationally, regionally and globally.

Annex I

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Annex II

PRE-WORKSHOP TRAINING ASSESSMENT

A training pre-assessment evaluation form was provided to participants to obtain feedback on the workshop. As a component of the pre-assessment questionnaire, participants were asked to indicate on previous training in GST/D in support of DRM. Based on information received from 92 responses, 58 per cent affirmed that they have received prior training and 42 per cent indicated that they have not. Table 1 provides a summary on the knowledge of the use of various GST tools in DRM and based on information obtained from the pre-workshop questionnaire.

Table 1: Training Pre- Needs Assessment Report (N=92)

How do you rate your knowledge of the use of the following tools for disaster risk management?	Below Average	Average	Fair	Good	Very Good
Knowledge of geographic information systems (GIS)	12%	12%	14%	35%	26%
Knowledge of spatial analysis tools	14%	17%	22%	29%	16%
Knowledge of satellite remote sensing	22%	21%	32%	20%	5%
Knowledge of global navigation satellite systems (GNSS or GPS)	17%	17%	25%	26%	12%
Unmanned aerial vehicle (Drone technology)	40%	20%	23%	11%	4%
Processing of satellite imageries	33%	23%	25%	11%	8%
Database design and management	23%	25%	21%	20%	11%

Number of Entries: N=92

Annex III

WORKSHOP EVALUATION FORM

Workshop on Effective Applications of Geospatial Technologies and Data in support of Disaster Risk Management in the Caribbean

Link to Online survey form:
https://forms.office.com/r/9DTwcSvE8R

TRAINING EVALUATION
In an effort to assess the effectiveness and impact of this workshop, kindly complete the following evaluation form. Your responses will be invaluable in providing feedback on the overall training, identifying areas of weakness and help improve the organization of future courses.

Sex	Age	Sector
☐ Female	☐ 30 or under	☐ Public
☐ Male	☐ 31 – 40	☐ Private
	☐ 41 – 50	☐ Academia
	☐ 51 or over	☐ Other (NGO, social organization, etc.)

Country of origin: _____**Country you represent:** _____

Institution(s) you represent: _____

Title/Position: _____

1. Have you previously received training in Geospatial Technologies and Data in support of Disaster Risk Management? Yes ☐ No ☐

2. How would you rate the following?

a. Content, Delivery & Organization	**Very Good**	**Good**	**Adequate**	**Below Average**	**Poor**
Pace and structure of the sessions	[ ]	[ ]	[ ]	[ ]	[ ]
Quality of reference materials	[ ]	[ ]	[ ]	[ ]	[ ]
Quality of activities and exercises	[ ]	[ ]	[ ]	[ ]	[ ]
Clarity of the content and presentations	[ ]	[ ]	[ ]	[ ]	[ ]
How would you rate the course overall?	[ ]	[ ]	[ ]	[ ]	[ ]

b. Facilitator	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
The trainers were knowledgeable and well prepared	[ ]	[ ]	[ ]	[ ]	[ ]
The trainers were engaging and encouraged questions and participation	[ ]	[ ]	[ ]	[ ]	[ ]
The trainers covered all the material clearly	[ ]	[ ]	[ ]	[ ]	[ ]
c. Impact	**Highly Useful**	**Useful**	**Adequate**	**Inadequate**	**Highly Inadequate**
Relevance of the topics and presentations for your work	[ ]	[ ]	[ ]	[ ]	[ ]
Relevance of the recommendations for your work	[ ]	[ ]	[ ]	[ ]	[ ]
Introduction to new approaches and techniques	[ ]	[ ]	[ ]	[ ]	[ ]
Strengthening of knowledge about universal and comprehensive social protection systems and its components	[ ]	[ ]	[ ]	[ ]	[ ]
Usefulness of the project proposal for your work	[ ]	[ ]	[ ]	[ ]	[ ]
Usefulness of the shared experiences and demos	[ ]	[ ]	[ ]	[ ]	[ ]

3. Did the training meet your expectations? Yes ☐ No ☐

4. What is the likelihood of using what you learned in this training?

Very Likely	Likely	Neutral	Unlikely	Highly Unlikely
[ ]	[ ]	[ ]	[ ]	[ ]

5. What were the most important outcomes / recommendations of the workshop?

_____

_____

6. How do you intend/expect to apply the knowledge acquired in this training workshop?

_____

_____

7. What are the Strengths of the training workshop?

8. What areas of improvement would you recommend?

Annex IV

CONCEPT NOTE

UNITED NATIONS

ECLAC

CCRIF SPC
The Caribbean Catastrophe Risk Insurance Facility

CONCEPT NOTE

Training Workshops on Policy and Applications of Geospatial Technologies and Data in support of Disaster Risk Management (DRM) in the Caribbean- Online

Workshops titles, venue, date and time

- Workshop #1: Policy Issues towards effective Applications of Geospatial Technologies and Data in DRM: Venue and Date - Online via WebEx on August 30, 2021.
- Workshop #2: Technical Issues towards effective Applications of Geospatial Technologies and Data in DRM: Venue and Date - Online via WebEx on September 6-8, 2021.

Introduction: Caribbean Small Island Developing States (SIDS) are considered to be particularly vulnerable to external shocks that stem from climate change impacts and in particular the increase in frequency and magnitude of natural disasters (ECLAC, 2011).[10] To significantly reduce the devastation caused by these disasters, the region needs to develop strategies of mitigation, preparedness, response, and recovery. In support of these requirements, a national database is required to provide accessible and up-to-date information containing such data as hospitals, infrastructure, logistics, hazard type and zones, population, building, transportation, hydrology, utilities etc. Decision makers can obtain precise information at all DRM stages by applying geospatial technologies (and data) such as remote sensors, drones, weather channels, Global Navigation Satellite Systems (GNNS).

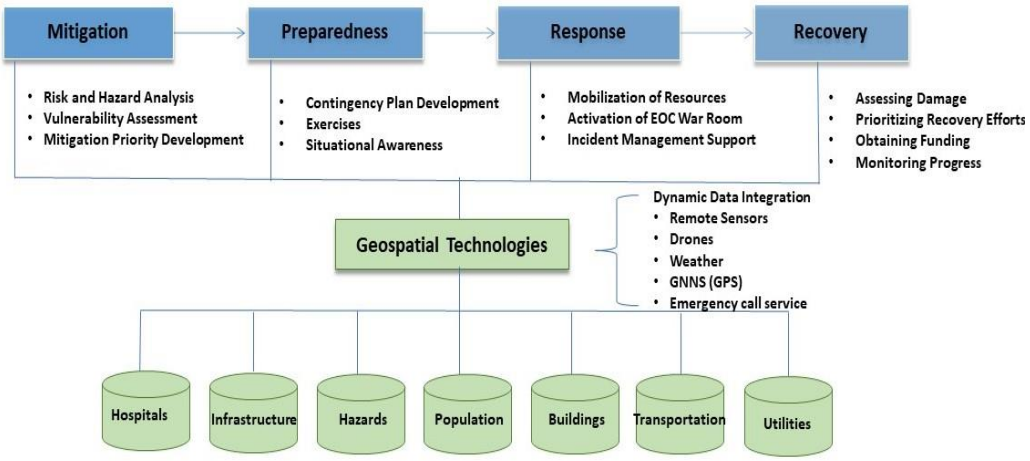
Geospatial technologies and data: Geospatial technologies comprise of the following components: computer hardware, data collection hardware, computer software, data and databases, personnel, and applications. These components work together to generate data to inform decision-makers and other stakeholders. These technologies also allow for information to be uploaded and shared globally to all agencies involved in disaster risk management. Geospatial technologies and data provide the platform for undertaking the following spatial analyses peculiar to DRM. This is illustrated in Figure 1. The following are examples of geospatial technologies and data:

- Temporal analysis of natural hazard parameters.
- Trend analysis of the occurrence of disasters.
- Spatial analysis of the impacts of disaster and over a geographic region.

[10] Reference: Economic Commission for Latin America and the Caribbean (ECLAC), Study on the vulnerability and resilience of Caribbean Small Island Developing, States (SIDS), LC/CAR/L.354 (2011).

- Three-dimensional analysis of the effects of natural hazards.
- Multivariable disaster risk analysis.
- Natural hazard prediction and modelling.
- Simulation of response rate to vulnerable communities.
- Analysis of impact zones or anticipated degree of severity.
- Storm runoff prediction and early warnings from watersheds.
- Site suitability screening and safe management for hazardous waste facilities.

Figure 7: Geospatial technologies and data in support of DRM



Source: GIS Framework for Disaster, link: https://www.esri.in/~/media/esri-india/files/pdfs/industries/gis-framework-for-disaster-management.pdf?la=en?la=en, cited July 15, 2201.

Caribbean Countries are at varying stages in the adaptation and applications of geospatial technologies and data in DRM. These include establishing policies, legislative procedures, institutional settings, determining technology and data requirements, and addressing capacity requirements. This approach is consistent with emerging global guidelines to provide geospatial support to DRM in all its phases.[11]

The benefits of use and applications of geospatial technologies and data in disaster risk management are:

- Provide integrated data storage, access, and data retrieval capabilities.
- Support a systematic approach to data collection and management.
- The facilitation of data sharing and access can reduce the overall costs of data collection and management.
- Increased comparability and compatibility of diverse data sets.
- It makes data accessible to decision-makers, and other stakeholders and supports informed decision making.
- Provides data and information to support the analysis of the impacts of disasters.

Towards supporting the Caribbean region in building national and regional capacities in the applications of Geospatial Technologies and Data in DRM, ECLAC, in cooperation with CCRIF SPC, are organizing two workshops as follows:

[11] Under the umbrella of the United Nations initiative on Global Geospatial Information Management (UN-GGIM) a Strategic Framework on Geospatial Information and Services for Disasters deliver references regarding governance, capacity building, data management, common infrastructures, and resource mobilization in these matters.

Workshop I: Policy Issues towards effective Applications of Geospatial Technologies and Data in DRM. To be held online via WebEx on August 30, 2021, at 9am-12noon (3 hours)

Target Audience: Workshop I is designed for senior technical officers having responsibilities in selecting and using technologies to support DRM.

Objectives of Workshop 1: The objectives of this high-level policy workshop are:

1. Provide on the applications of geospatial technologies and data to support decision making in DRM.
2. Identify capacity development issues needed to enhance mainstreaming of geospatial technologies and data in DRM.
3. Examine global guidelines to improve the support to risk management through the use of geospatial technologies and data.
4. Identify policies and governance requirements for geospatial technologies and data management.
5. Identify financial mechanisms and regional technical cooperation required to harness the full benefit of geospatial technology and data.

Workshop II: Technical Issues towards effective Applications of Geospatial Technologies and Data in DRM. This workshop will be held via WebEx on September 6-8, 2021, from 9:00am-12:00pm each day (9 hours).

Target Audience: Workshop II is designed for technical officers responsible for GIS and application developers supporting DRM**.**

Objectives of Workshop II:

1. Applications of Geospatial Technologies and data in DRM.
2. Identify and address data and data management requirements in DRM.
3. Examine the current state of geospatial technologies available to support DRM.
4. Identify human capacity needs to enhance mainstreaming of geospatial technologies and data in DRM.
5. Identify areas of regional technical cooperation supporting geospatial technologies and data with applications in DRM.

---

end

Annex V

PROGRAMME

Workshop I: Policy Issues towards effective
Applications of Geospatial Technologies and Data in support of Disaster Risk Management in the Caribbean
Virtual meeting
30 August 2021
9:00 a.m. - 12:00 p.m. (UTC-4)

PROGRAMME

0900 hrs – 0915 hrs	**Opening of the session and Welcome remarks** - Ms. Diane Quarless Director, ECLAC Subregional Headquarters for the Caribbean - Ms. Gina Sanguinetti Phillips, Technical Assistance and Corporate Communications Teams, CCRIF SPC (formerly the Caribbean Catastrophe Risk Insurance Facility) - *Moderator: Artie Dubrie – Coordinator for the Sustainable Development and Disaster Unit – ECLAC POS*
0915 hrs – 0920 hrs	**Introduction of resource persons, participants, and overview of agenda** *Facilitator: Artie Dubrie – Coordinator for the Sustainable Development and Disaster Unit – ECLAC POS*
0920 hrs – 1000 hrs	**Session 1: Applications of Geospatial Technologies and Data in support of DRM.** *Facilitator*: *Jacob Opadeyi, Disaster Risk Management Consultant*
1000 hrs – 1030 hrs	**Session 2: Human capacity development issues for effective mainstreaming of Geospatial Technologies and Data in DRM.** *Facilitator: Jacob Opadeyi, Disaster Risk Management Consultant*
1030 hrs – 1035 hrs	**Coffee Break/Cell Phone Break**
1035 hrs – 1100 hrs	**Session 3: Supporting Geo-enabled DRM within the Caribbean region**: UN-Global Geospatial Information Management (UN-GGIM) Working Group on Geospatial information and Services for Disasters, Caribbean Geospatial Development Initiative (CARIGEO) and National Emergency Response Geographic Information Systems Team (NERGIST). *Facilitator: Simone Michelle Lloyd, GISP MSc.; Senior GIS Manager/Trainer, Coordinator, Jamaica's National Emergency Response GIS Team, Task Groups*

Lead, UN-GGIM WG Disasters- National Spatial Data Management Branch; Ministry of Housing, Urban Renewal, Environment & Climate Change, Jamaica

1100 hrs –1130 hrs **Session 4: National governance challenges in implementing Geospatial technologies and data in DRM**:
5 Minute interventions from selected Caribbean Countries followed by Floor Discussions
Moderator: Artie Dubrie – Coordinator for the Sustainable Development and Disaster Unit – ECLAC POS

1130 hrs – 1155 hrs **Session 5: Round table discussions on the use of geospatial technologies in Disaster Risk Financing (DRF) and DRM**
5 Minute Interventions and followed by floor interventions.

- Economic Commission of Latin America and the Caribbean-Subregional Headquarters for the Caribbean, Artie *Dubrie-Coordinator for the Sustainable Development and Disaster Unit – ECLAC POS.*
- Caribbean Disaster Emergency Management Agency, *Renee Babb GIS Specialist – CDEMA*
- CCRIF SPC (formerly the Caribbean Catastrophe Risk Insurance Facility) - *Ms. Gina Sanguinetti Phillips, Technical Assistance and Corporate Communications Teams, CCRIF SPC*

Moderator: Willard Phillips, Economic Officer, Sustainable Development and Disaster Unit – ECLAC POS

1155 hrs – 1200 hrs **Vote of Thanks and Closure**
Facilitator: Artie Dubrie - Coordinator for the Sustainable Development and Disaster Unit – ECLAC POS

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